

Summary

The overall project goal is to increase the number of UCR Hispanic students pursuing post-secondary and post graduate degrees in food and agricultural sciences and entering careers in academia, civil service, and the biotech industry. This project will address research and business skills acquisition required to tackle emerging plant diseases within the citrus genome. This will be accomplished through an intensive summer research experience for 16 Dynamic Genome (DG) Scholars competitively-chosen from rising second-year students at UCR. Students eligible for these summer experiences will have successfully completed a unique hands-on laboratory class, the Dynamic Genome course, in which they are introduced to computational and experimental analysis of plant genomes, and will participate in a short authentic research project originating from PI Wessler's laboratory's peer-reviewed, funded research awards. Based on past and projected enrollment estimates, approximately 100 Hispanic students will be eligible each year for the 8 summer stipends. An additional 200 UCR undergraduates, approx. 60% underrepresented minorities, will be impacted by participating in a new plant disease module in the primary discipline of Plant Sciences and Horticulture, jointly developed by DG Scholars and project personnel. Anticipated outcomes will be: (1) gains in awareness by participating Hispanic students of food and agriculture-related careers; (2) gains by participating Hispanic students in skills necessary for employment in food and agriculture-related careers; (3) dissemination of new curricula for grade levels 9-16 concerning the NIFA priority need area Global Food Security; and (4) established collaborations with the Keck Graduate Institute, governmental, and non-governmental non-profit organizations, and industry partners, to enhance career attainment of underrepresented, Hispanic students.

Objectives

Objective 1: DG Scholars will participate in scientific research to become leaders in food and agriculture-related careers through mastery of bioinformatics and genomics skills and experimental design.

Objective 2: DG Scholars will gain knowledge in careers in agricultural science and business.

Objective 3: Develop materials and modules to strengthen courses at UCR and other institutions. These will include information on careers in agribusiness and research projects utilizing the citrus genome and plant material from local stores.

Objective 4: Develop relationships with KGI and other non-profit organizations that will provide internships that increase Hispanic and URM student awareness in food and agricultural careers.

Beneficiaries

Output/Activity	Output Numbers
8-week summer experiential learning	8 sophomores per year (16 total)
Mentoring of freshman by DG Scholars	10-15 freshman per year (30-40 total)
9-16 Curriculum developed by DG Scholars	1 unit to be developed per year (2 total)/ Used in 8 on-campus workshops (150-200 students) and 1-2 HS teacher trainings (10- 20 teachers)

Neil A. Campbell Science Learning Laboratory

DG Scholars and the other beneficiaries will use the space and resources of the Campbell Lab. This includes two 900 sq. foot teaching laboratories equipped for molecular biology experiments and a similar sized bioinformatics discussion room.



Institutions and Priority Area

•Institutions

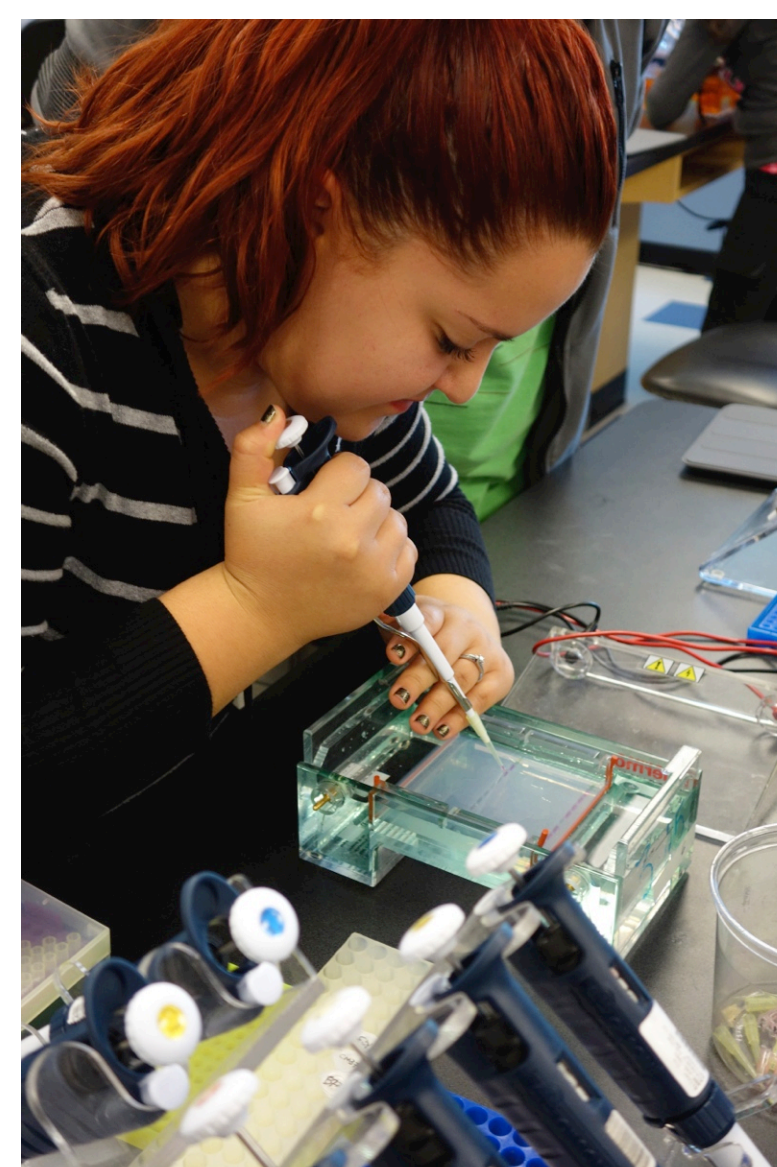
- University of California, Riverside
- Keck Graduate Institute, Claremont, CA

•USDA Collaborator

- USDA-ARS National Clonal Germplasm Repository for Citrus and Dates, (NCGRCD), UC Riverside

•NIFA Priority Area

- Global Food Security



Activities

1. Student Experiential Learning: Eight students who took the Dynamic Genome Course will be recruited for an 8-week summer research experience.

A. Week 1: Agribusiness Workshop at Keck Graduate Institute (KGI), Dr. Steve Casper. The workshop will include educational seminars, co-curricular events, and the launch of a team-project that students will work on first during week 1 at KGI and then continue during the rest of the summer research experience at UCR while they are also working with citrus.

B. Weeks 2-8: Experiential Research Experience

- Citrus genomics research: In this project, we propose to extend the expertise of our DG course graduates to analyze citrus diversity, exploring sequence data on specific accessions of sweet orange and clementine, and validate apparent sequence polymorphism (SNPs, indels) in the laboratory using computational and experimental analysis. The project will access the more than 1000 citrus varieties maintained at UCR and the USDA-ARS NCGRCD.
- Curriculum Development: Course modules based on citrus research: During the 7 weeks at UCR, DG Scholars will work with instructors to develop modules for use in high school and college classes. The modules will provide instructional and background material that allow grades 9-16 students to explore global food security and hunger problems. Students will experience a research project where they genotype citrus varieties found in the local markets.



Evaluation

The evaluation will be completed by SmartStart Educational Consulting Services and will use a mixed methods approach using qualitative and quantitative indicators.

•Formative Evaluation: monitors the effectiveness of project implementation and provides ongoing feedback to project leaders to strengthen implementation over the course of the project. Participants will complete Likert scale and free response evaluation forms to assess satisfaction and learning at the end of the summer learning experience.
•Summative Evaluation: assesses achievement of short and long-term outcomes. Guiding evaluation questions are aligned with the goals of the USDA HSI Education Grants program and are based on the outcomes of this project. Is this project on track to achieve the following long-term project and USDA outcomes?

- Increase the number of UCR Hispanic students pursuing post-secondary and post graduate degrees in plant research and entering careers in academia, civil service, and the biotech industry
- Enhance quality of 9-16 agriculture-related curriculum
- Improve skills necessary for employment in agriculture-related careers
- Increase students' awareness of agriculture-related careers
- Enhance career attainment of underrepresented, Hispanic students through increased collaborations with KGI, governmental, and non-governmental non-profit organizations, and industry partners

Acknowledgements

The PDs would like to thank USDA NIFA for the major funding of this project. We would like to acknowledge additional support from UCR, HHMI, and the NSF.